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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,172	12/22/2003	Kenichi Kawase	3712174.00453	7752

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K&L Gates LLP
P. O. BOX 1135
CHICAGO, IL 60690

EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1726	

NOTIFICATION DATE	DELIVERY MODE
04/27/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/743,172	KAWASE ET AL.	
	Examiner	Art Unit	
	CYNTHIA LEE	1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 March 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-12 and 15-21* is/are pending in the application.

4a) Of the above claim(s) *1 and 9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4,7,8,10-12 and 15-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/14/2011 has been entered.

Response to Amendment

This Office Action is responsive to the amendment filed on 3/14/2011. Claims 6 and 14 are canceled. Claims 1-4, 7-12, 15-21 are pending. Claims 1 and 9 are withdrawn from further consideration as being drawn to a non-elected invention. Applicant's arguments have been fully considered. Claims 2-4, 7, 8, 10-12, 15-21 are finally rejected for reasons stated herein below.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-4, 7, 8, 10-12, 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jito (US 2002/0117469) and Shackle (US 5436091).

Regarding claims 2 and 10, Jito discloses a battery and an anode, comprising: an anode current collector having a projection formed on a substrate [0010]; and an anode active material layer being formed on and covering an anode current collector through CVD [0013] or sputtering [0026], and including silicon (Si) and silicon [0015].

The instant Specification pg 5, lines 13-20 states that

"The projection 11B preferably includes an element which can be alloyed with the anode active material layer 12, because the projection liB promotes alloying between the anode current collector 11 and the anode active material layer 12, thereby the adhesion properties are further improved. More specifically, the projection 11B preferably includes at least one kind of constituent or element which are easily alloyed with silicon or a silicon compound, for example, copper, nickel (Ni), iron (Fe), aluminum (A1), indium (In), cobalt (Co), manganese (Mn), zinc (Zn), silver (Ag), tin (Sn), germanium (Ge), lead (Pb) and the like."

Regarding claims 2 and 9, the projection includes an element capable of being alloyed with the anode active material layer because the current collector is made of copper [0020].

Regarding claim 3 and 11, the anode active material layer is alloyed with the anode current collector in at least a portion of an interface with the anode current collector because the current collector is made of copper [0020].

Regarding claim 6 and 14, the projection includes an element capable of being alloyed with the anode active material layer because the projection is made of copper [0020].

Regarding claim 7 and 15, the projection includes copper [0020]

Regarding claim 8 and 16, the anode active material layer is alloyed with the projection in at least a portion of an interface with the projection because the projection is made of copper [0020].

Regarding claim 17, the electrolyte includes a body 4 and 5, a solvent and an electrolyte salt ([0033] and fig. 1).

Regarding claim 18, a package part for containing the cathode, the anode and the electrolyte therein. Considering the broadness of the term "film," it is noted that the can 4 and 5 of Jito reads on Applicant's "film". See fig. 1.

Regarding claim 19, the cathode includes a lithium-containing metal composite oxide [0031].

Regarding claims 2, 10, 20, 21, Jito discloses projections, but does not disclose the average diameter of the projection. Shackle teaches a current collector made of a microroughened surface. The microroughened surface can be prepared a number of ways. It can be made by electrodeposition of metal particles, preferably copper or nickel particles onto the electrode substrate. For example, electrodeposited foils, particularly copper and nickel foils, are preferred. It is also possible to use other processes which result in a similar degree of roughness. The dimensions include irregularities which protrude from the surface by a distance at most 10 microns, and particularly at least 0.1 micron (4:55-5:1). Such processes can create the microrough surface by removal of material from a smooth surface, e.g., by etching, by chemical reaction with a smooth surface, e.g., by galvanic deposition, or by deposition of a microrough layer of the same or a different material on a smooth surface (5:5-10).

Regarding claim 4 and 12, the irregularities can be of the same shape as those produced by electrodeposition, e.g., generally spherical nodules protruding from the surface, or they can be of a different shape (5:2-5).

Further, Shackle teaches that electrodeposited foils, particularly copper and nickel foils, are preferred for use in this invention. It is also possible to use other processes which result in a similar degree of roughness, e.g., irregularities which protrude from the surface by a distance of at least 0.03 microns, preferably at least 0.1 microns, particularly 0.1 to 100 microns, and which have at least one dimension parallel to the surface which is at most 500 microns, preferably at most 100 microns, particularly at most 10 microns, and which is preferably at least 0.03 micron, particularly at least 0.1 micron. The irregularities can be of the same shape as those produced by electrodeposition, e.g., generally spherical nodules protruding from the surface, or they can be of a different shape. Such processes can create the microrough surface by removal of material from a smooth surface, e.g., by etching, by chemical reaction with a smooth surface, e.g., by galvanic deposition, or by deposition of a microrough layer of the same or a different material on a smooth surface (emphasis added). See (4:60-5:10). Shackle recognizes that the size of the protrusion affects the adhesion of the electrode on the current collector. Shackle teaches that the protrusion size is a result effective variable. It has been held by the courts that discovering an optimum value or workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the size of the projections of Jito, as taught by Shackle, for the benefit of improving the adhesion between the active material and the current collector. It is noted that absent specific distribution of the protrusion size, the protrusions of Shackle has been interpreted as the average protrusion size.

Response to Arguments

Applicant's arguments filed 3/14/2011 have been fully considered but they are not persuasive.

Applicant asserts that Jito teaches that a surface treatment layer or oxide laver is formed on its anode current collector before the etching occurs. See, Jito, page 1, paragraphs 10-14; page 2, paragraphs 24-25. In fact, Jito is entirely directed to etching its current collector to remove part or all of the surface treatment layer or oxide layer because the surface treatment or oxide layer suppresses diffusion of the current collector material into the anode active material. See, Jito, page 1, paragraphs 9-10 and 14; page 2, paragraphs 24-25; Table 1. Nowhere does Jito teach or suggest etching the anode current collector itself, rather than the surface treatment or oxide layer, to remove the current collector material. As such, one of ordinary skill in the art would understand that if any "projections" are formed by etching, the -projections would be formed of the same material as the surface treatment layer or oxide layer. For example, if the surface treatment or oxide layer is completely removed by etching, no projections would be formed. Alternatively, if part of the surface treatment or oxide layer is removed such that

the etching resulted in alleged "projections" formed on the surface of the current collector, the projections would necessarily be formed of the remaining surface treatment or oxide layer. Jito teaches that the surface treatment layer includes materials for chromate treatment, silane coupling treatment or benzotriazol treatment, and the oxide layer is formed of an oxide film. See, Jito, page 1, paragraphs 12-14; page 2, paragraphs 24-25. Nowhere does Jito teach that its surface treatment or oxide layer includes an element capable of being alloyed with the anode active material layer.

In response, Jito discloses removing at least part of the surface-treated layer by etching the surface of the current collector with an ion beam or plasma in order to improve the diffusion of the current collector material into the thin film; and depositing the thin film on the surface of the current collector subjected to the etching step [0010]. When the presence of a surface-treated layer suppresses the diffusion of the current collector material into the active material thin film, according to the present invention, it is possible to promote the diffusion of the current collector material into the thin film, thereby obtaining excellent adhesion [0011]. As the current collector for a secondary battery such as a lithium secondary battery, a metallic foil such as a copper foil is generally used [0012].

The Examiner notes that "projections" are formed on the surface of Jito's current collector because the surface has been etched. Further, the active material forms an alloy with the current collector because the current collector is made of copper. The instant Specification pg 5, lines 13-20 states that active material silicon forms an alloy with copper.

Regarding Applicant's arguments to the product by process limitation, it is moot in light of the new interpretation of Jito.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795